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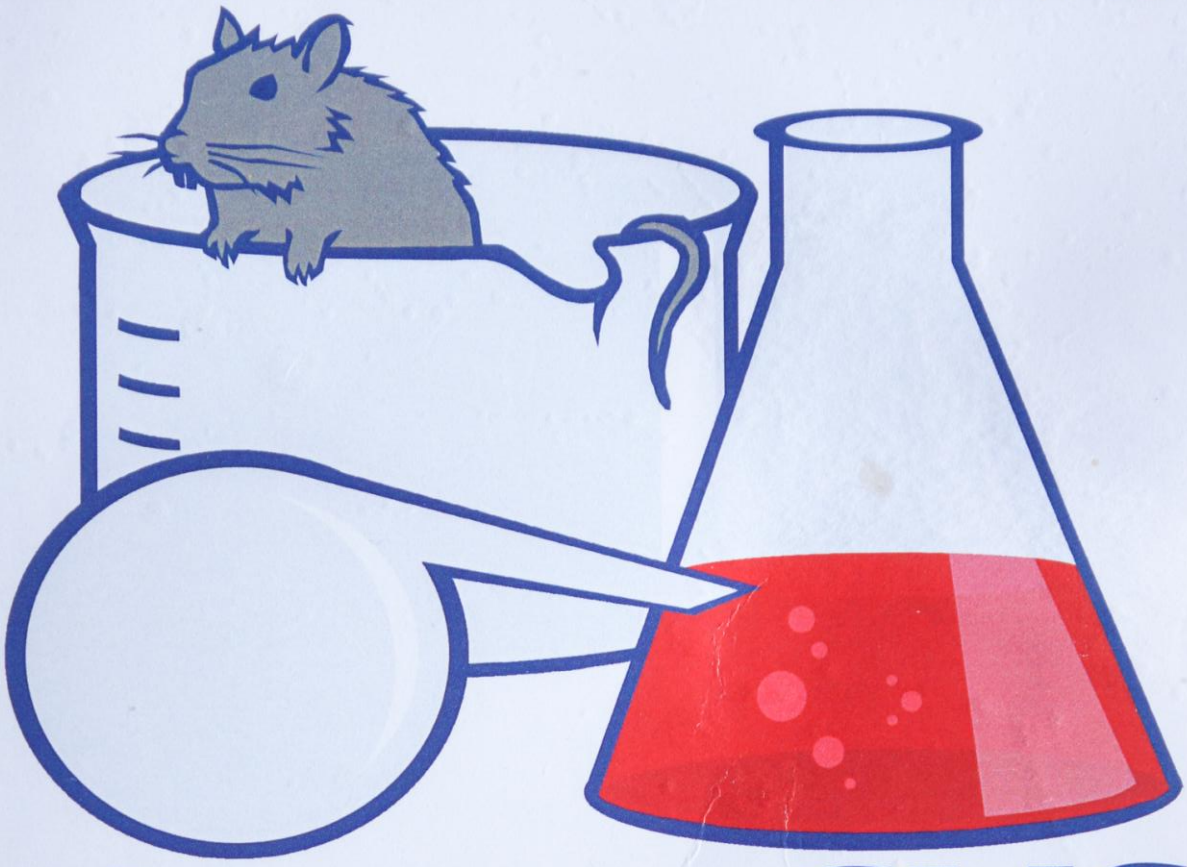

ChemCYS

1-2 MARCH 2012

Chemistry Conference for Young Scientists 2012

Duinse Polders, Blankenberge, Belgium

BOOK OF ABSTRACTS

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Selective hydrolysis of unactivated amide bond by zirconium(IV)-substituted Lindqvist-type polyoxometalates

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Selective cleavage of peptides and proteins is one of the most important procedures in analytical biochemistry. However, the extreme inertness of the amide bond with a half-life estimated to be up to 600 years under the physiological pH and temperature makes this task highly challenging. Several proteolytic enzymes are available, but they are usually not regioselective and cleave proteins in short fragments which are difficult to identify. Few existing synthetic reagents require harsh conditions and even when applied in great excess over the substrate, they tend to cleave proteins with partial selectivity and low yields. Metal-substituted polyoxometalates (POMs) have been developed as promising reagents for the hydrolysis of the amide bond. By using monolacunary Lindqvist anions $[W_5O_{18}]^{6-}$ as ligands for Zr(IV) ion, we have created a novel approach for selective and efficient peptide hydrolysis. With the highly negative charge of the POM and strong Lewis acidity, oxophilicity and redox inactivity of Zr(IV), the zirconium(IV)-substituted Lindqvist-type polyoxometalate is able to selectively interact with positively charged dipeptides as well as positive protein regions and promote hydrolysis of the peptide bond. In this paper, the hydrolysis of various dipeptides was studied in the presence of the complex $(Me_4N)_2[W_5O_{18}Zr(H_2O)_3]$ by ^{1}H and ^{13}C NMR spectroscopy. The molecular mechanism of the peptide bond cleavage has also been elucidated from detailed kinetic experiments.

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CERTIFICATE OF ATTENDANCE

We hereby confirm that **Mrs. Hong Giang Ly Thi** has participated in ChemCYS 2012 (Chemistry Conference for Young Scientists), organized in Blankenberge, Belgium, on March 1st and 2nd, 2012, by Jong-KVCV, the youth division of the Royal Flemish Chemical Society. She contributed to our conference with a poster presentation entitled *"Selective hydrolysis of unactivated amide bond by zirconium(IV)-substituted Lindqvist-type polyoxometalates"*.

For Jong-KVCV,

Tim Duerinck,
Chairman of ChemCYS 2012

Yannick Vercammen,
Chairman of Jong-KVCV